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T H E

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SPONGES.

BY BRYCE M. WRIGHT, JR.



Do sponges belong to the animal or vegetable kingdom seems to be the first question which presents itself to our mind in investigating these curious organisms, and this question involves a definition of a boundary line between the two kingdoms, which, of all the most perplexing queries that can be found for an unlucky naturalist, perhaps is the most difficult. Eminent zoölogists have, at various times, ranked them as belonging to the class of Zoöphyta, but others equally clever have disputed this right, and have claimed them as belonging to the vegetable kingdom. In the celebrated work of Dr. Johnston on British Zoöphyta, he disposes of them in a very summary manner. The following extract deserves attention: "if they are not the production of polypes, the zoölogist who retains them in his province must contend that they are individually animals, an opinion to which I cannot assent seeing that they have no animal structure or individual organs, and exhibit no one function usually supposed to be characteristic of the animal kingdom. Like vegetables they are permanently fixed; like vegetables they are non-irresistible; their movements, like those of vegetables, are extrinsical and involuntary;

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their nutriment is elaborated in no appropriated digestive sac, and, like cryptogamous vegetables or algæ, they usually ramify and grow in forms determined by local circumstances, and if they present some peculiarities in the mode of the imbibition of their food, and in their secretions, yet even in these they evince a nearer affinity to plants than to any animal whatever." This argument is certainly very favorable to their classification with plants, but there are other arguments by zoölogists equally clever in favor of their classification with animals. Linnæus seems to have changed his opinion several times respecting them. In the commencement of his great work he considered them as plants, or at all events as very doubtful animals; but in a later edition of his "*Systema Naturæ*," he seems to have admitted them along with the zoöphytes in the animal kingdom. In the opinion of Pallas, deBlainville, and others, they are intermediate organized bodies, without any determinate form, and with little susceptibility of feeling, but presenting an absorbent surface, and nourished pretty nearly like vegetables by the surrounding medium.*

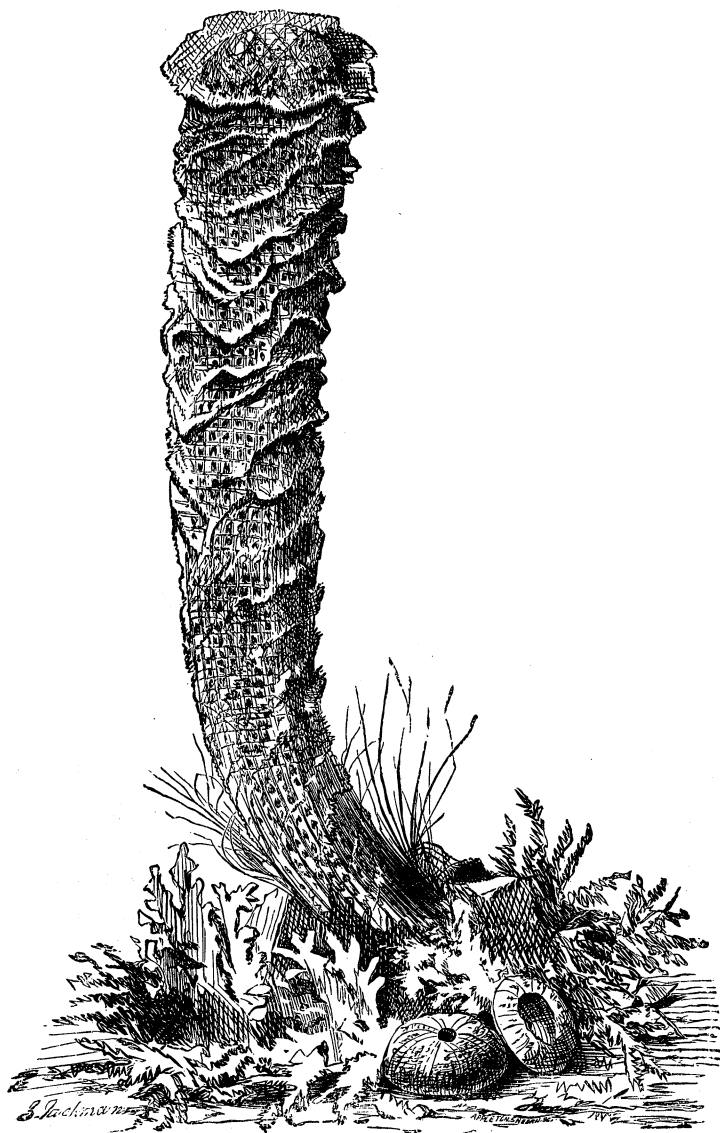
Sponges consist of a framework, or skeleton, coated with gelatinous matter, and forming a non-irritable mass, which is connected internally with canals of various sizes. The ova are very numerous, and present in appearance the form of irregular shaped granules derived from the gelatinous matter, which grow into ciliated germs and falling at maturity into the small canals, are then expelled by the orifices. When alive the body is covered by a gelatinous film, which, being provided with cilia causes a current of water to pass in at the smaller pores and out at the larger apertures, the sponge probably assimilating the nutritive particles which enter into the water. Papers have been written from time to time endeavoring to prove that the pores palpitate, but this has been stoutly denied, and perhaps the cause of their

*The sponges are, by the most advanced zoölogists, considered to be undoubtedly animals; all botanists reject them from the vegetable kingdom.— *Editors.*

being moved in such a manner as to give rise to this discussion is in consequence of the action of the water in passing through them. According to the analysis of sponges by Hornemann, they consist of a substance "similar to osmazone, animal mucus, fat oil, a substance soluble in water, a substance only soluble in potash, and traces of chloride of sodium, iodine, sulphur, phosphate of lime (?), silica, alumina, and magnesia." The quantity of silica which constitutes the structure of sponges is remarkable. It generally occurs in the form of spiculæ in considerable quantities, embedded in the substance or body of the sponge. In the species of *Halichondria*, the silicious spiculæ are pointed at the extremities, whilst the spiculæ of some are pointed at one end only, and are round at the other; sometimes they appear cylindrical, curved, or straight. The spiculæ of the genus *Pachymatisma* are often sharp at one extremity and at the other expand into two points; some are sharp at one end and expand at the other into three points; the *P. Johnstonia* can be taken as an example of the latter. The genus *Tethea* possess silicious spiculæ having hooks at both ends, and amongst the genera *Grantia*, *Geodia*, and in the Levant Sponge, the spiculæ are very large and radiate into three directions like a three pointed star. When properly mounted they form very beautiful microscopic objects. The spiculæ of the *Grantia nivea* show them to be of the triradiate, or three pointed, star shape, those of the *Halichondria Griffithii* in the form of pins, whilst those of the common sponge, from the Philippine Islands, are sometimes in the shape of crutches or stars. In the common Madrepore Sponge (*Dactylochalix pumicea*) the silicious element is fully developed as the whole mass is composed of this extremely hard substance, which is disposed in tubular and radiating canals. One of the rarest, and I may say most beautiful of the silicious sponges, is the *Euplectella** *speciosa* Gray (Fig. 76). It is described in the "Transactions of the Zoölogical Society

* *Eu*, well; and *pleko*, I weave.

Fig. 76.



of London," by Prof. Owen, as the *Euplectella aspergillum*, from the fact of its being in shape like the common *Aspergillum Javanicum* of Java. "Mr. Cuming" says Prof. Owen "has entrusted to me for description one of the most singular and beautiful as well as the rarest of the marine productions, with which his researches in the Philippine Islands have enabled him to enrich the zoölogical collections of his native country." The first specimen of this remarkable sponge was purchased by Mr. Cuming, the celebrated conchologist, at the death of Mr. William J. Broderip, who had formerly given the sum of £30 to become the possessor of this then unique *Euplectella*. This specimen, the only one known for a great many years, is now in the possession of the authorities of the British Museum in England, by whom it is greatly prized in consequence of its possessing the gelatinous film in its natural state. It certainly is one of the most curious and extraordinary combinations of fibrous and silicious structure which the bed of the ocean has ever yielded up to the researches of the naturalist. It differs materially from any sponges with which we are acquainted, being regular in its form. It is of cornucopia shape, and has a horny skeleton-like network, composed of large silicious fibres running from the base to the head, surrounded by smaller fibres, forming square open meshes resembling a net or basket-work. It ranges in height from six to even fifteen inches. At the lower extremity, or root, it averages about an inch in thickness, but its size gradually increases as it approaches the top, where often it is two inches wide. It is surmounted by a ridge about quarter of an inch wide, and is closed at the larger extremity by a delicate open lace work of fibres possessing no particular pattern. It is on this light and pretty structure that the fibrous gelatinous substance rests, resembling in texture the common sponge, but in this instance disposed in an irregular foliated pattern, over which the usual film of the sponge is laid during life. The base or root attaches itself to almost anything which may serve as a sup-

port; some being fixed to rocks, others to shells, and indeed any submarine objects which may present a surface strong enough to answer the purpose required. It is remarkable, but nearly all the specimens I have examined of this sponge have had enclosed in them a common hermit or soldier-crab. How this pugnacious member of the crustacean class becomes imprisoned it is difficult to conceive. Dr. Gray, of the British Museum, in speaking of them in "Land and Water," a London periodical, says that "the natives of the Philippine Islands deny that they are sponges, but say that they are formed by the crabs that are usually found in them, and that a pair of crabs form two close together. Hence they regard two specimens, as we should call them, a single individual." They consist of pure silica, and Mr. C. G. Brewster, naturalist, Boston, to whose courtesy I am indebted for the accompanying faithful engraving, has several specimens which, having lost their outer covering or film, have been cleaned by being placed in a weak solution of chloride of lime, and afterwards exposed to the action of the atmosphere. The Euplectella is found principally near the island of Zebu, one of the Philippine's, where the first specimen was obtained by the late Hugh Cuming.

The forms of sponges are very irregular, some being branched, others round or pear-shaped, and others resembling a cup, like the well known "Neptune's cup" of the Indian Seas. During life they are extremely beautiful in colors, possessing tints which it would be impossible to describe, and which I do not think have ever been faithfully represented in consequence of their beauty departing immediately after life ceases. Dr. Johnson states that the green color of the fresh-water sponge (*Spongilla fluviatilis*) depends upon the action of light, as he has proved by experiments which showed that "pale-colored specimens became green when they were exposed for a few days to the light and full rays of the sun; while on the contrary, green specimens were blanched by being made to grow in darkness or

shade. All sponges are aquatic, and with few exceptions marine. They attach themselves to all manner of objects which may present a point of support, whether floating or fixed; some select their abode on very unexpected objects. In one case recorded in the "Natural History of British Sponges," by Dr. Johnson, a specimen belonging to the genus *Halichondria*, a sponge not uncommonly found on some of our coasts, was discovered growing from the back of a small live crab,—“a burden” says the learned Doctor, “apparently as disproportionate as was that of Atlas,—and yet the creature has been seemingly little inconvenienced with its arboreous excrescence.” The fresh-water sponge (*Alcyonella stagnorum*) is frequently to be met with floating in docks attached to logs of timber. It is very interesting to observe that these low organisms even seem to be attracted to each other, as it were in family groups. The *Alcyonellæ* live in groups of from ten to fifteen, and some sponges are so intimately connected as to be inseparable. Respecting their geographical distribution they are to be met with in all seas, and although they abound to a much greater extent in the tropics, even on the coast of Great Britain a great many species occur, nearly forty having been reckoned to belong to one genus alone.

RAMBLES IN FLORIDA.

BY R. E. C. STEARNS.

PART IV.

It was nearly noon of a delightful day in February when leaving the City of Tampa we crossed the Hillsborough River to the opposite bank for the purpose of visiting Rocky Point, which is situated upon *old* Tampa Bay; the route, for the greater part of the distance of seven miles, is through an